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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/574,187

02/21/2007

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GJE001-US

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EXAMINER

VINH, LAN

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/574,187	<b>Applicant(s)</b> COOKE ET AL.	
	<b>Examiner</b> LAN VINH	<b>Art Unit</b> 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 February 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>043007</u> .  | 6) <input type="checkbox"/> Other: _____                          |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites the limitations "the material" and "the quenching" in claim 1.

There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-11, 13-19, 21-24 rejected under 35 U.S.C. 102(b) as being anticipated by Ni et al (US 6,257,168)

Ni discloses a plasma processing reactor, the inductively coupled plasma reactor comprises: a chamber 300 within which one gas is caused to flow (col 5, lines 30-32), a plasma generator 306 for causing the gas within the chamber to form a plasma, thereby generating at least one species (col 5, lines 35-40), a ring 350 having curved section/guide for directing the gas flow containing the species towards the substrate (col

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6, lines 20-30; fig. 3); wherein the reactor/apparatus is arranged such that the width of the plasma 320 in use is greater than that of the substrate 312, the difference between the widths defining an outer region of plasma (fig. 3). It is noted that claims 1, 2, 7, 8, 13, drawn to an apparatus and the recitations of "is adapted to direct species from substantially all of the outer region, towards the substrate", "is adapted to direct towards the substrate at least the species generated substantially at or adjacent the periphery of the plasma", "is adapted to cause a net flow of species across the substrate", "is adapted to shield the substrate from electromagnetic radiation originating from the plasma" and "is arranged to prevent the quenching of active species within the gas flow" are considered as intended use/functional claim language. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528,531 (CCPA 1959). Also, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987)

Regarding claim 3, Ni discloses that the reactor comprises a showerhead/ a deflector device within the chamber for directing the introduced into the chamber towards most active region of the plasma (col 5, lines 47-59)

Regarding claims 18-19, 21, Ni discloses that the reactor comprises a support 314 for supporting the substrate 312, the support 314 is located within the chamber (col 6, lines 25-30), the ring/guide 350 is mounted to the support 314 (fig. 3)

Regarding claim 22, Ni discloses that an electrical system 316 supplying electrical power to the support (fig. 3)

Regarding claim 23, Ni discloses that the ring/ the guide is arranged to have an external dimension just less than that of the chamber (fig. 3)

Regarding claim 24, Ni discloses that the ring 402/ the guide further comprises an underside surface arranged to recompress the plasma as it flows substantially radially in a region adjacent the edge of the substrate (fig. 4)

Regarding claim 5, fig. 3 of Ni shows that the ring 350/guide is substantially linear in section.

The limitations of claims 4, 7-8, 13, 17 have been discussed above

Regarding claim 6, fig. 4 of Ni shows that the ring 402/ the guide is substantially a hollow conical frustum

Regarding claims 9-11, Ni discloses that the reactor comprises an electrical path/an electrically conducting mesh and a power supply 306

Regarding claim 15, Ni discloses that the ring/guide is heated (col 10, lines 60-63)

Regarding claim 16, Ni discloses that the ring is detachable in one embodiment (fig. 5 ), the ring/guide is formed/connected to the chamber wall (fig. 3)

3. Claims 25-28, 30, 33-38 are rejected under 35 U.S.C. 102(b) as being anticipated by Ni et al (US 6,257,168)

Ni discloses a method for plasma treating a substrate comprising: causing one gas of chlorine to flow within a ICP chamber (col 5, lines 28-32), forming a plasma from the

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gas within the chamber using a RF plasma generator, thereby generating at least one species (col 10, lines 15-32), an electrical system 316 supplying electrical power to the support (fig. 3) and directing the gas flow containing the species towards the substrate (col 6, lines 25-30); wherein the width of the plasma in use is greater than that of the substrate, the difference between the widths defining an outer region of plasma, and wherein the species are directed from substantially all of the outer region, towards the substrate (fig. 3)

The limitations of claims 26, 17, 28, 30, 38 have been discussed above

Regarding claims 33-34, Ni discloses performing a etching process (col 10, lines 20-25), a deposition treatment to deposit polymer (col 9, lines 45-48)

Regarding claims 35, 37, Ni discloses the plasma species 356 are generated adjacent to the periphery of the substrate and across the substrate (fig. 3)

Regarding claim 36, Ni discloses that the gas through the gas injector 310 is directed toward the most active region of the plasma (fig. 3)

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ni et al (US 6,257,168) in view of Huang et al (US 20030082920)

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Ni reactor has been described above. Unlike the instant claimed invention as per claim 12, Ni fails to disclose using a magnet/plasma termination device

Huang discloses a dry etching chamber comprises inductive coil and magnet (para 0020)

One skilled in the art at the time the invention was made would have found it obvious to modify Ni reactor to include magnet as per Huang to apply magnetic field to the plasma source which improves the plasma uniformity in the reactor.

4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ni et al (US 6,257,168) in view of Yoshimura et al (US 6,059,985)

Ni reactor has been described above. Unlike the instant claimed invention as per claim 20, Ni fails to disclose using a movable support to provide a variable distance between the plasma and the substrate

Yoshimura discloses a plasma apparatus comprises a movable support 10 to support a substrate (col 7, lines 52-57)

One skilled in the art at the time the invention was made would have found it obvious to modify Ni reactor to include a movable substrate support to prevent another plasma from entering into the space between the substrate and the plasma thus improving plasma uniformity

5. Claims 29, 31, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ni et al (US 6,257,168) in view of Demmin et al (US 6,635,185)

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Ni method has been described above. Unlike the instant claimed invention as per claims 29, 31, 32, Ni fails to disclose the specific values of the chamber pressure, power input and gas flow rate

Demmin, in a method of etching, discloses that chamber pressure, power and etching composition flow rate are plasma etching operating conditions that can have an effect on the results obtained (col 7, lines 15-20)

One skilled in the art at the time the invention was made would have found it obvious to vary the chamber pressure, power input and gas flow rate in Ni method by conducting routine experimentations in order to optimize these value in view of Demmin teaching since Demmin discloses that one skilled in the art can vary these parameters accordingly to etch a desired material satisfactorily (col 7, lines 20-25)

### ***Conclusion***

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is (571)272-1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lan Vinh/  
Primary Examiner, Art Unit 1792